

Expert Meeting on Software for the IPCC 2006 Guidelines

15-17 April 2008

WMO Headquarters, Geneva, Switzerland

Meeting Report

1 Background

The Task Force Bureau (TFB) at its last meeting agreed that the software for the 2006 IPCC Guidelines should be developed in stages or phases. The first phase was to develop a demonstration version of the software covering the Energy Sector. Following the TFB decision the TSU held an open tender and, following a review of the bids received by a committee including representatives of the TFB Co-Chairs, Institute for Global Environmental Strategies (IGES) and the TSU, awarded the contract to SPIRIT a.s.¹.

This software is now being developed and two review versions have been circulated to experts including CLAs and Energy Volume authors of 2006 Guidelines, participants of Qatar Meeting (January 2007) Editorial Board Members of the Emission Factor Database as well as the TFB members to invite their comments. A third version, including responses to comments, was made available just before this review meeting..

The review meeting was held in Geneva, 15-17 April. (The list of participants is annexed to this report.) The aim was to decide if the second phase should go ahead and to provide some feedback on the demonstration software and guidance on the implementation of the remaining sectors. The discussions were based on the demonstration version of the software and comments received, the latest version of the demonstration software by SPIRIT a.s. and the agreed specification.

2 Results

The meeting:

- Agreed that, generally, the design and appearance of the software is fit for purpose;
- Agreed that, the second phase of development of complete software covering all sources should commence;
- Noted a number of corrections and refinements should be implemented. These are detailed below;
- Discussed and agreed how the remaining sectors should be implemented;
- Also discussed features that could be implemented in a third phase.

It was clear that all the participants at the meeting agreed that the existing demonstration software was suitable as a basis for further developments. The third version of the software, which was introduced in detail to the meeting participants during the meeting, answered most of the comments about the operation of the software, backups, and linkage of simultaneous users of the software in a single country. While a number of issues were discussed at the meeting and some points had to be clarified there were no major problems.

Phase 1 still needs to be finished and a further phase 1 version of the software is anticipated in June.

Following a successful demonstration of the phase 1 requirements the TSU can issue a tender for phase 2 which will cover all the remaining sectors at Tier 1, and where relevant, at Tier 2 as well.

The detailed comments from the meeting are given below for, firstly for the energy sector demonstration software and then, in section 4, for phase 2 implementation.

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Detailed Comments and Conclusions on the Demonstration Software

Topic	Status	Decision taken
Inventory start year and final year	Currently the start year is 1990 and latest year is current year	Inventory start year and final year should be user-defined in the preferences box.
Documentation	“Documentation” in worksheets and “documentation box” in reports are suitable for our needs	‘Documentation’ for each record in the worksheets should be renamed ‘Remarks’.
GWPs	GWPs not yet implemented in Energy sector (they are needed for KCA and Uncertainty analysis). They will be user-defined.	Do not use term “GWP” use “CO2 equivalent factors”. Factors will be enterable by the “super-user”, IPCC factors from SAR, TAR and AR4 will be available for selection or new factors can be entered.
Number of significant digits	Numbers are not rounded in display or reports	No rounding should be performed during the calculations. For presentation of the reports, users should be able to specify the number of digits to be displayed.
Fuel types and fuels	Currently different fuel types (SOLID, LIQUID etc.) are displayed separately and selected from a drop down menu.	Add “All Fuels” to drop down menu which will then display all fuels for an aid to inventory compilers.
Addition of new units for fuel consumption	Currently only TJ and Gg are allowed	It should be possible to add new units of fuel consumption (such as m3 as in the guidelines) but USERS will have to input a conversion factors (TJ/unit) for these new units, the system should also understand Mg, Tg, MJ, PJ etc. If m3 selected then warning to users that they need to enter their own factor.
Notation Keys	Not yet Implemented	Implementation as shown in Table 1 of this report. Two codes from the Guidelines are treated differently NA (Not Applicable) is not needed for the software. Confidentiality (C): data will be flagged as confidential and entered into worksheet. Second Phase: the software may need to only display the confidential data to the data enterer or super-user.
Colour scheme of the interface	The colour scheme is fixed and not liked by all. Calculated values are coloured differently – this is good.	If it is feasible, there should be an option to chose other colours or TSU and SPIRIT to find a better colour scheme.
QA/QC	Name in software	Rename “Quality Control”

Topic	Status	Decision taken
Uncertainty	Not yet implemented	To be implemented.
Information/Memo Items	Software does not indicate how these are dealt with	Leave it as it is
Key Category Analysis (KCA)	Not yet Implemented	To be implemented following the Guidelines. User will have the option to modify the categories/gas combinations for the KCA. SPIRIT will check whether this flexibility is feasible within the present state of development of the software. This could be in next phase(s).
Quality Control	Currently: Completeness check (list categories without data) and existing range checks.	This is OK for phase 1. Ideas for Phase 2 and 3 are given below.
Time Series Display	Not yet Implemented	To be implemented (display of Emission x Year, tables and graphs).
1.B.1.b	No worksheet in guidelines	Use worksheet for stationary combustion. Emission factors only for coal for CO ₂ , (Anthracite; Coking Coal; Other Bituminous Coal; Sub-Bituminous Coal; Lignite; Oil Shale and Tar Sands)
1.B.1.c	No worksheet in guidelines	There is no 1.B.1.c category in volume 2 this is a fugitive emission form solid fuel conversion. (see 1.A.1.c for combustion emissions for this category.) A worksheet with simply 3 cells to enter emissions of CO ₂ , CH ₄ and N ₂ O calculated elsewhere or measured is needed.
CCS	No worksheet in guidelines	Use the 2 reporting tables as data entry table. Should be accessible for worksheet menu and under reporting menu table is displayed as at present.
Data Entry	Currently data is typed in (or cut and paste) cell by cell	This is as specified for Phase 1. Needed.
Grand totals of activity data should be displayed in each worksheet		It will be addressed in the next version.
NCV or GCV	Currently not displayed	Must be indicated
Multiple rows with the same fuel	Currently these can only be distinguished by the remarks field.	It was agreed this is OK.

Topic	Status	Decision taken
Creating New Year	Can be based on previous year only. Currently can save any previous year into XML and import into a new year.	Must be able to base new year on any other year.
Backup	Manual system implemented	Automatic back-up system will be implemented, if possible.
Road Transport	Now follows Tier2. (Detailed aggregation is Tier 2, Tier 1 is at level of total fuel use...)	Needs to be able to enter data at tier 1 level (aggregated level) as well as Tier 2 more detailed sub-categories.

Table 1 Use of Notation Keys and How they Used

Code	Meaning	Applicability	Comment
NO	Not occurring	Activity data only	All these notation keys will be treated as zero in any summation of calculations based on records where they are used.
NE	Not estimated	Activity data or emission factor	
IE	Included elsewhere	Activity data only	

3 Sectoral Issues

3.1 IPPU

IPPU Sector module can be developed in a similar way to that for Energy Sector module. It should be noted there are three spreadsheet calculation sheets for F-gases (Category 2.F.) that were developed by the 2006 GLs authors. These models should become part of the software.

3.2 AFOLU

AFOLU categories can be considered in two groups (from a software development perspective):

1. Categories that depend on a disaggregated land area classification e.g. Biomass, DOM, Soils and Biomass Burning
2. Categories that depend on nationally aggregated data, e.g. N₂O from soils; Liming; Urea Application; Livestock and manure management; and Rice

This will be reflected in the software. The software will follow the worksheets in the guidelines and implement Tier 1 methods. These could be filled directly by hand (by entering data, defaults of national factors. (This could be extended in some case in a potential phase 3 e.g. DOM in forests remaining forests where the Tier 1 default is zero.)

For stock change categories where there is no Tier 1 worksheet (as the default is zero change) we should have a "worksheet" for the entry of data calculated elsewhere, in order to extend the flexibility of the software in line with the text of the guidelines.

Entering land area data and classification is a problem. There was a broad discussion over the issues and difficulties of this. After extensive discussion it was decided that SPIRIT assisted by the TSU and authors as necessary will develop a detailed proposal on the basis of the discussions. The main features of this will be:

- Allow for Approach 1 and 2 for land area classification;
- Will try to ease data entry for users by ensuring the same data is entered only once;

- Reduce chance of errors by allowing the land classification matrices to be use for checking entered data;
- Will consider if and how links to default data can be made
- XML, or other import will enable import from other software
- Excel or text file data entry will also allow users to enter multiple data items at once.

QC checks - Links to other sectors

The software should present a similar data used in different sectors for consideration by the users. Differences may be OK or may indicate errors so this will be a valuable QC check. Examples are:

- Biomass harvested and that used for energy use
- Urea production and fertiliser use
- Sewage sludge production, application to land and amount burnt
- Peat extraction and burnt for energy or used in horticulture
- Production of manure and amounts burnt for energy

The HWP spreadsheet has an option to line to the SWDS spreadsheet in the waste sector where specific numbers have to be exchanged.

•There are some specific QC checks in the guidelines within the AFOLU sector that can be implemented in the software. These concern the consistence of land areas within and across years, and livestock numbers and manure production.

3.3 WASTE

Waste Sector module can be developed in a similar way to that for Energy Sector module. It should be noted there is a First-Order Decay (FOD) model that was developed by the 2006 GLs authors. This model should become part of the software.

3.4 OTHER

Only a data entry sheet is needed here.

4 General Issues beyond Phase 1

Topic	Status	Decision taken
Addition of guidelines as pdf files or hyperlinked HTML files	Currently little information is given of link to guidelines	Hyperlinks could be added to HTML version of Guidelines for each category. Resources will determine when this can be done.
Reference Approach	Not Yet implemented	Needs to be implemented in phase 2 Option should be under Quality Control not Worksheets.
Deleting data:	It is not clear how to delete /undo data which have been typed in. How to do it is explained in the user manual.	SPIRIT and TSU to try to improve the manual.
Size of database	Currently uses MS Access	SPIRIT: db is small and size is not a problem
Information/Memo Items	Software does not indicate how these are dealt with	Leave it as it is
Restart	Currently does not restart at same worksheet	Look at options and feasibility
Currently can only see on year at a time	Would like to see time series	Should be able to see tables of Activity data x Year and Emission factor x Year. These should be editable as it will be a way of checking and correcting numerical errors.
Export/Import	Can export a category or sector or entire inventory for one year and import it into a new inventory by REPLACING existing data	Need to optionally be able to add additional row with new data so the final inventory is the sum of the import and existing data. Identifiers on the imported records are needed.
Help comments	Currently very limited	Hyperlinks to appropriate sections of the guidelines would be desirable. Implementation, resource dependant.
Only XML import currently available	Need a facility to bulk upload data in other formats	This needs to be able to import time series as well as single year data. Export to spreadsheets and import from spreadsheets desirable. Import from text files (e.g. csv) an option.
QC (Phase 2)	Not Yet implemented	Time series analysis tools: graphs, outlier detection
QC (Phase 2/3)	Not Yet implemented	Display value of similar parameters in different sectors for QC by users. <ul style="list-style-type: none"> ➤ Biomass burnt (in Energy & AFOLU sector) ➤ Waste as energy (in Energy & waste sector) ➤ methane recovery from waste (in Energy & waste sector) ➤ Woody waste and HWP (Waste and AFOLU) ➤ Natural gas: combustion and fugitives (Energy) ➤ Non energy use of fuels, (Energy & IPPU) particularly <ul style="list-style-type: none"> ✓ Iron & Steel ✓ Ammonia

ANNEX

List of Participants

IPCC Expert Meeting on Software for the 2006 IPCC Guidelines

15-17 April 2008

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